

CLAIMS:

We claim:

1. A multi-port, bottom-filling injection device comprising:
 - a filling head having a plurality of spouts;
 - a platen having a plurality of spout channels through which the plurality of spouts can pass, wherein each one of the plurality of spouts is vertically aligned
 - 5 with one of the plurality of spout channels; and
 - a holding apparatus disposed above the platen, wherein the holding apparatus is capable of securing a chambered food item upon the platen.
2. The multi-port, bottom-filling injection device of Claim 1 wherein the filling head further comprises a spout cap that distributes a flow of filling among the spouts, which are attached to the spout cap.
3. The multi-port, bottom-filling injection device of Claim 1 wherein each one of the plurality of spouts has an elongate, cylindrical midsection and a tapered injection tip.
4. The multi-port, bottom-filling injection device of Claim 1 wherein each one of the plurality of spouts has a sharp end.
5. The multi-port, bottom-filling injection device of Claim 1 wherein each one of the plurality of spouts has a spout-tip opening at its terminal end.

6. The multi-port, bottom-filling injection device of Claim 1 wherein each one of the plurality of spouts has at least one spout-tip opening on its side near its terminal end.
7. The multi-port, bottom-filling injection device of Claim 1 wherein the filling head further comprises a positive shut-off mechanism for shutting off a flow of filling to the plurality of spouts.
8. The multi-port, bottom-filling injection device of Claim 1 wherein the platen further comprises a depression mold for receiving a food item.
9. The multi-port, bottom-filling injection device of Claim 8 wherein the depression mold of the platen has a five-pointed star shape.
10. The multi-port, bottom-filling injection device of Claim 1 wherein each one of the plurality of spout channels is wider than the diameter of each one of the plurality of spouts.
11. The multi-port, bottom-filling injection device of Claim 1 wherein the plurality of spout channels can accommodate several spout sizes and arrangements.

12. The multi-port, bottom-filling injection device of Claim 1 wherein the holding apparatus comprises a header and a plurality of stems attached to the header.
13. The multi-port, bottom-filling injection device of Claim 1 further comprising a rope conveyor that comprises a plurality of ropes, wherein said platen further comprises a plurality of parallel grooves, and further wherein said ropes lie within said parallel grooves.

14. An automatic bottom-filling injection system comprising:
- a supply conveyor for providing a plurality of chambered food items;
 - a platen conveyor disposed adjacent to the supply conveyor;
 - at least one filling head, wherein the at least one filling head comprises a
- 5 plurality of spouts and is disposed beneath the platen conveyor;
- a filling container for holding a filling; and
 - a pumping system for transferring the filling to the at least one filling
- head.
15. The automatic bottom-filling injection system of Claim 14 wherein the platen conveyor is perpendicular to the supply conveyor.
16. The automatic bottom-filling injection system of Claim 14 wherein the platen conveyor is an indexing conveyor.
17. The automatic bottom-filling injection system of Claim 14 wherein said pumping system comprises:
- a rotating cam disposed within a three-port valve;
 - a filling container connected to the three-port valve;
- 5 a filling head supply tube connected to the three-port valve;
- a piston cylinder connected to the three-port valve; and
 - a piston disposed within the piston cylinder.

18. The automatic bottom-filling injection system of Claim 14 further comprising a rope conveyor that comprises a plurality of ropes, wherein said platen conveyor further comprises a plurality of parallel grooves, and further wherein said ropes lie within said parallel grooves.

19. A method for filling a chambered food item using a multi-port, bottom-filling injection device, said method comprising the steps of:

- a) providing a chambered food item upon a platen conveyor, wherein the platen conveyor has a plurality of spout channels;
- 5 b) indexing the chambered food item on the platen conveyor until the food item is positioned directly over a filling head having a plurality of spouts;
- c) positioning a holding apparatus about the chambered food item to secure the chambered food item;
- 10 d) raising the filling head until the plurality of spouts passes through the plurality of spout channels and pierces the chambered food item;
- e) transferring filling through the filling head and into the chambered food item;
- f) lowering the filling head until its spouts are below the platen conveyor; and
- 15 g) removing the holding apparatus from about the chambered food item.

20. The method for filling a chambered food item of Claim 19 wherein the chambered food item is a star-shaped doughnut having five chambers.

21. The method for filling a chambered food item of Claim 19 further comprising the step of retracting a small amount of filling from the filling head, wherein the retracting occurs after the transferring of filling of step e) and before the lowering of the filling head of step f).

22. The method for filling a chambered food item of Claim 19 wherein said platen conveyor further comprises a plurality of grooves, said providing a chambered food item of step a) is preceded by a step of interlacing a rope conveyor within said grooves, and said removing the holding apparatus of step g) is followed by a
5 step of transferring the food item from the platen conveyor to the rope conveyor by separating the rope conveyor from the platen conveyor.